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Original Article

Total Inguinal Canal Mobilization in Two-Stage Orchiopexy

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Abstract

Background: Many different techniques have been described to treat undescended testes. We aimed to study a new technique of two-stage orchiopexy with total inguinal canal mobilization to prevent cord damage and testicular atrophy.

Methods: Between March 2002 and July 2005, we operated on 16 testes with short spermatic cord. In the first stage, the testes were anchored to the pubic tubercle and 6 months later (second stage) they were fixed in the scrotum through total inguinal canal mobilization. The patients were followed up by pre and postoperative physical examination, sonography of scrotum, and serum testosterone level measurement for 6-12 months.

Results: Two of the 16 testes developed atrophy but 14 had volume increase. Mean testicular volumes of preoperative and 1 and 6 months postoperative testes were 0.69 ± 0.22 ml, 0.84 ±0.26 ml, and 1.06 ±0.33 ml respectively. The volume increase was not only significant 1 (P=0.012) and 6 (P=0.002) months after the second operation compared with the first operation but also a significant increase in the volume was noted between the 1st and 6th month after the operation (P=0.003). All testes were in scrotum after 6-12 months and the patients had normal serum testosterone level for their ages before and after the operation.

Conclusion: Two-stage orchiopexy with total inguinal canal mobilization prevents vascular damage in the second stage of operation.

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Keywords ● Undescended testis ● testicular atrophy ● inguinal canal

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Introduction

Bevan and co-workers,[1] have defined the principles of operating on undescended testes; however many different techniques with success rate of 73-77% have been described for operating on short cord testes to decrease the high rate of postoperative testicular atrophy.
In some instances the testes do not descend to scrotum because of short spermatic cord even after extensive dissection; therefore ligating the vasculatures lead to high rate of testicular Atrophy.[2,3] Laparoscopic techniques have made remarkable results but in many developing countries laparoscopy equipments have not yet been available.

We aimed to study a new method of two-stage orchiopexy to prevent vascular damage and testicular atrophy in undescended testes with short cord.

Materials and Methods

Between March 2002 and July 2005, we operated on 14 patients with mean age 8.5±2.8 years (range from 2 - 14) with undescended testes and short cords using two-stage orchiopexy. Totally 16 testes were operated on.

Informed consents were taken from the parents before the operation. Serum testosterone level was checked for all patients before the operations. We examined all patients under general anesthesia for preoperative detection of palpable testes. We then explored the inguinal canal via inguinal incision in *Langer's* line.

In the first stage, the testes were made free from the surrounding tissue in the inguinal canal and their attached sacs were highly ligated above the bifurcation of vas deferens and gonadal vessels retroperitonealy and testes were fixed to the pubic tubercle or inguinal ligament with low tension on the cord by using Prolene 3-0.

After 4-6 months, all testes were re-explored through two parallel incisions on medial and lateral roof of inguinal canal. The lateral incision was deepened through reflexion of inguinal ligament and the medial incision was deepened through conjoined tendon into the retroperitoneum. Consequently, the testes and floor of the inguinal canal (transversalis fascia) were brought up to the inferior border of internal ring by blunt (peanut) and sharp dissection with great care of underlying vessels. Internal ring was incised circumferentially and total inguinal canal with cord were mobilized (total canal mobilization) [figures1-3].

The defect of the inguinal canal was repaired by simple stitches of 4-0 poly daxanone suture through inguinal ligament and conjoined tendon. The tunica vaginalis of testes were fixed in the scrotum to dartos fascia. All patients were followed up by routine physical examination, sonographic measurement of testicular volume (8 MHz linear probe using [length× wide×0.71]),[1] and measuring serum testosterone levels 1 and 6-12 months after the 2nd stage.

Data were analyzed using SPSS software version 13. Repeated measure ANOVA was used for comparison of mean testicular volumes during the 6-month follow-up. Differences of mean testicular volumes among the groups during the various periods of treatments were compared by Wilcoxon test.

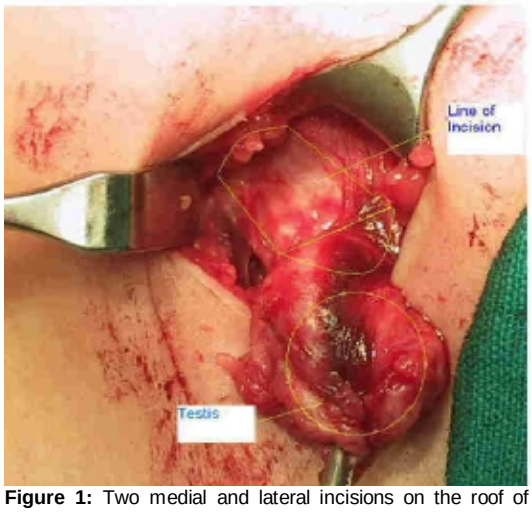

Figure 1: Two medial and lateral incisions on the roof of inguinal canal and boundary of dissection demonstrated.

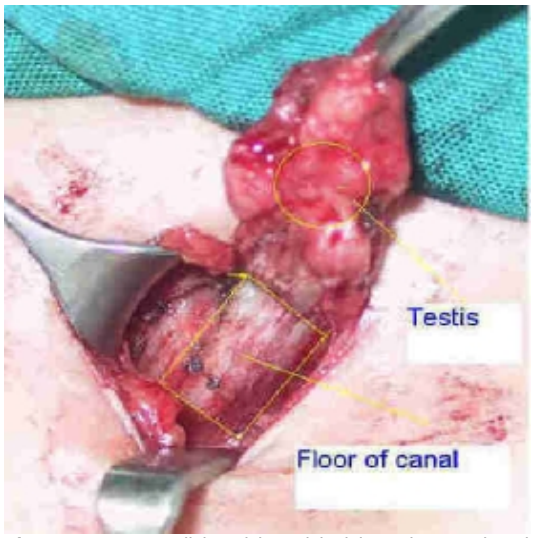

Figure 2: Two medial and lateral incisions deepened and floor of inguinal canal raised.

Results

Twelve of the 16 testes were right sided and the remaining four were in left. There was no congenital abnormality in the patients' genitourinary tract. All testes could be fixed in scrotum in the second stage of operation. Median operations times for stages I and II were 32 and 67 minutes, respectively.

There was no wound hematoma or infection. All testes were remained in scrotum in 6-12-month follow-up and no recurrence happened. All patients had serum testosterone levels in the normal range for their ages before and after the operation. Two of the 16 testes (12.5%) developed atrophy but the remaining 14 (87.5 %) testes had volume increase. Mean testicular volumes of preoperative and 1 and 6

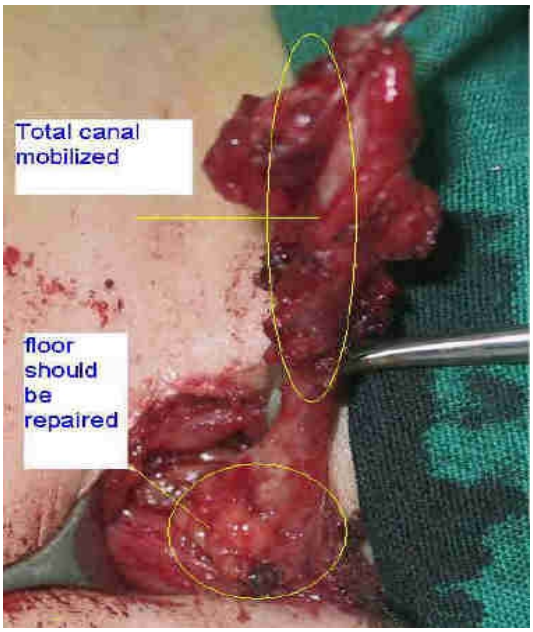

Figure 3: Total inguinal canal mobilized.

months postoperative testes were 0.69 ± 0.22 ml, 0.84 ±0.26 ml, and 1.06 ±0.33 ml respectively. The volume increase was not only significant 1 (p=0.012) and 6 (p=0.002) months after the second operation compared with the first operation but also a significant increase in the volume was noted between the 1st and 6th month after the operation (p=0.003).

Discussion

Outcome of orchiopexy in palpable or impalpable testes with short cord, depends on surgeon's experience. Such testes are very prone to be damaged by surgeon or the methods used. All surgeons usually use the basic principles for orchiopexy but sometimes several maneuvers are needed to fix the testes in the scrotum.[1]

The Fowler-Stephens orchiopexy,[3] is performed using laparoscope in one or two stages. This method can only be done if extensive dissection of the vas and cord has not already been done. The testis is to survive on the blood supply of the vas deferens and the cremasteric attachments and extensive dissection in hope of achieving the adequate length of spermatic cord carries too much risk.[3] This method is usually preferred for those impalpable testes that their operation plan had been determined before orchiopexy. However, in many developing countries laparoscope equipment is not available and the only means of treatment is still canal exploration.[4]

The routine two-stage orchiopexy is used without division of the spermatic vessels when the other maneuvers have failed to gain adequate length spermatic cord. The testis is anchored in its lowest possible position (high scrotum or pubic tubercle) with or without the cord covered by a Silastic sheath. Anchoring and traction on cord structures might cause some testicular damage and re-dissection of cord is very demanding and has a high risk of testicular damage.[5]

Dissection of cord with attached fascia in the second stage has been proposed as *en bloc* spermatic cord mobilization, which keeps the posterior and lateral wall of canal intact.[6,7] In our proposed method the testis is anchored with lowest traction while total canal mobilization helps less experienced surgeons to dissect easier. However, this method has the risk of bleeding from the underlying vessels in peritoneal space and femoral canal.

Cortes and colleagues,[8] have reported that 68.7% of the impalpable testes they operated on, were in the scrotal position in a 6-month follow-up. Riebel and others,[9] reported that 19% of the impalpable testes they operated on, had atrophied and 3% of patients had wound infection with dehiscence, which healed by prescribing antibiotics and dressing.[8] Two of the 16 testes (12.5%) in our study developed atrophy but there was no wound infection or dehiscence. Fourteen of the 16 testes (87.5 %) had volume increase in follow-up, which shows better vascular preservation.

Conclusion

Two-stage orchiopexy with total inguinal canal mobilization prevents vascular damage in the first stage by not ligating the vasculature of extensively dissected cord and in the second stage by wide margin of surrounding tissue.

Conflict of Interest: None declared

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